

REMARKS

Claims 1-4, 6-9, 11, 15-18, and 20-22 are currently pending. By this Amendment, claims 5, 10, 12-14, and 19 were cancelled without prejudice or disclaimer, claims 1-4, 6-9, 15, 16, and 18 were amended, and new claims 21 and 22 were added. Applicants will pursue the broader subject matter canceled by this Amendment in a continuing application.

Applicants acknowledge and appreciate the Examiner indicated in the most recent Office Action dated November 29, 2002, that claim 20 was allowable, and that claims 5 and 19 contained allowable subject matter. Accordingly, claims 1 and 4 were amended to include the allowable subject matter of claim 5, and claim 9 was amended to include the allowable subject matter of claim 19, thereby placing these independent claims in condition for allowance.

Claims 1-4 were additionally amended to replace the term "monochloromonofluoromethane" with the term "chlorofluoromethane," which was originally recited in independent claim 9. Further to these amendments a consistent term is now used throughout all the pending claims. Additionally, the claims 3, 4, and 18 were amended to recite the proper names of the compounds recited therein. Finally, claims 15 and 16 were amended to remove reference to multiple claims, and new claims 21 and 22 were added to recite the subject matter canceled from claims 15 and 16, respectively. Applicants submit that no new matter was added by these amendments.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

CONCLUSION

Further to these amendments and remarks, Applicants respectfully submit independent claims 1, 4, and 9, as well as all claims dependent thereon are now in condition for allowance. Accordingly, Applicants request the timely allowance of pending claims 1-4, 6-9, 11, 15-18, and 20-22.

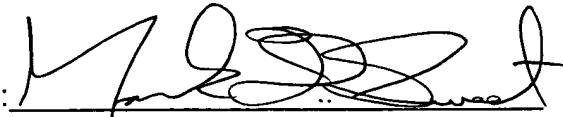
Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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By:


Mark D. Sweet
Reg. No. 41,469

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

APPENDIX TO AMENDMENT
Version with Markings to Show Changes Made

Amendments to the Claims

1. (Twice Amended) A process for the production of difluoromethane comprising:
 - (a) contacting dichloromethane with hydrogen fluoride in the presence of a fluorination catalyst to produce a product stream of difluoromethane, monochloromonofluoromethane chlorofluoromethane, and unreacted starting materials and
 - (b) separating difluoromethane from the product stream from step (a) comprising distilling the product stream from step (a) to separate a top stream comprising difluoromethane and hydrogen chloride from a bottom stream comprising hydrogen fluoride, chlorofluoromethane and unreacted dichloromethane, wherein sufficient hydrogen fluoride is employed in the process such that during step (b) the molar ratio of hydrogen fluoride to monochloromonofluoromethane chlorofluoromethane is at least about 100:1.
2. (Amended) A process as claimed in claim 1, in which wherein the molar ratio of hydrogen fluoride to monochloromonofluoromethane chlorofluoromethane is at least about 150:1.
3. (Amended) A process as claimed in claim 1 in which wherein additional hydrogen fluoride is added to the process stream recovered from step (a) in order to ensure that the required ratio of hydrogen fluoride to HCFC-31 chlorofluoromethane is achieved during step (b).
4. (Amended) A process for the production of difluoromethane comprising
 - (a) contacting dichloromethane with hydrogen fluoride in the presence of a fluorination catalyst to produce a product stream comprising difluoromethane, monochloromonofluoromethane chlorofluoromethane and unreacted starting materials,

FINNEGAN
HENDERSON
FARA BOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

(b) separating difluoromethane from the product stream from step (a) comprising distilling the product stream from step (a) to separate a top stream comprising difluoromethane and hydrogen chloride from a bottom stream comprising hydrogen fluoride, chlorofluoromethane and unreacted dichloromethane, and

(c) recovering difluoromethane and recycling HCFC 31-chlorofluoromethane to step (a),

wherein sufficient hydrogen fluoride is employed in the process such that during step (b) the molar ratio of hydrogen fluoride to monochloromonofluoromethane-chlorofluoromethane is at least about 100:1.

6. (Twice Amended) A process of claim 4 5 in which wherein the fluorination catalyst comprises a metal oxide, metal fluoride or oxyfluoride.

7. (Amended) A process as claimed in claim 6 in which wherein the metal of the oxide, fluoride, or oxyfluoride is at least one of chromium, aluminum, zinc, nickel, cobalt, copper and magnesium.

8. (Amended) A process as claimed in claim 7 in which wherein the catalyst comprises zinc or a compound of zinc and a metal oxide, fluoride or oxyfluoride in which the metal of the oxide, fluoride or oxyfluoride is chromium or aluminum.

9. (Twice Amended) A process for producing difluoromethane comprising the steps of:

(A) preheating a composition comprising hydrogen fluoride and dichloromethane to form a vaporized and superheated composition;

(B) reacting the preheated composition of step (A) in the presence of a fluorination catalyst under conditions suitable to form a product stream comprising difluoromethane, chlorofluoromethane, hydrogen chloride, dichloromethane and hydrogen fluoride;

(C) recovering by distillation from the product stream of step (B) a high boiling fraction comprising hydrogen fluoride, dichloromethane, and chlorofluoromethane and a

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

low boiling fraction comprising difluoromethane, hydrogen chloride, hydrogen fluoride, and reaction byproducts; and

(D) recovering substantially pure difluoromethane from the low boiling fraction of step (C),

wherein the hydrogen fluoride and the chlorofluoromethane are present in the product stream in a mole ratio of ~~at least about 100:1~~ from about 25:1 to about 75:1.

15. (Amended) The process of claims claim 1 or 9 wherein the fluorination catalyst is a pretreated fluorination catalyst.

16. (Amended) The process of claims claim 1, 9 or 15 wherein the fluorination catalyst is chromium oxide.

18. (Amended) The process of claim 9 wherein step (D) further comprises the substeps of:

(E) treating the low boiling mixture of step (C) in an ~~HCl-hydrogen chloride~~ distillation column or an aqueous ~~HCl-hydrogen chloride~~ absorption tower under conditions suitable to remove ~~HCl-hydrogen chloride~~ and trace ~~HF-hydrogen fluoride~~ to form a crude ~~HFC-32-difluoromethane~~ product;

(F) treating the crude ~~HFC-32-difluoromethane~~ product formed in step (E) with a first caustic scrubber under conditions suitable to form a neutralized product;

(G) treating the neutralized product of step (F) in a second caustic scrubber under conditions suitable to form a substantially chlorine-free product;

(H) treating the substantially chlorine-free product of step (G) with a sulfuric acid scrubber and subsequently with a solid desiccant to form a substantially moisture-free product; and

(I) distilling the substantially moisture-free product of step (H) under conditions suitable to produce substantially pure difluoromethane.

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